AMBIENT AIR QUALITY IMPACT REPORT – 12/13/2006
(PSD Permit SE 02-01)

I. APPLICANT

Caithness Blythe II, L.L.C.
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II. PROJECT LOCATION

Caithness Blythe II, L.L.C. (Blythe, or Applicant) has submitted an application for a Prevention of Significant Deterioration (PSD) permit for the construction of Blythe Energy Project II (BEP II), a natural gas-fired, nominal 520 megawatt (MW) power plant. The proposed facility will be located near Interstate 10 and the Blythe airport, five miles west of the city of Blythe in eastern Riverside County, CA. The portion of the Mojave Desert Air Quality Management District where the project would be located is designated attainment/unclassified for the National Ambient Air Quality Standards for ozone, nitrogen dioxide, particulate matter under ten microns in diameter (i.e. PM10), carbon monoxide, and sulfur dioxide.

The proposed facility will be located on private land adjacent to the Blythe Energy Project. The Blythe Energy Project is owned Florida Light and Power and is currently operating.

III. PROJECT DESCRIPTION

The proposed facility will consist of combustion turbine generators (CTGs) that produce thermal energy through the combustion of natural gas and air. The thermal energy is then converted into mechanical energy to drive the CTG compressor and electric generator to produce electricity. The plant will be equipped with two F-class Siemens V84.3A CTGs operating in combined cycle mode and generating approximately 170 MW each at 59°F ambient temperature. The plant is expected to have an average annual availability greater than 95% and operate up to 8,760 hours per year.

Compressed air enters each CTG combustion chamber where natural gas fuel is injected and ignited. The hot combustion exhaust gases expand through the turbine causing it to rotate and drive electric generators. The hot gases then enter the heat recovery steam generator (HRSG), through which water is circulated. The heat transferred from the hot gases converts the water into superheated steam, which is used to drive a steam turbine generator (STG) to generate electricity. Steam leaving the STG enters a condenser through which cooling water is circulated. The steam is then condensed into water and

delivered back to the HRSG. To increase steam production during periods of high ambient temperatures and for operating flexibility, each HRSG is equipped with a natural-gas-firing duct burner for supplemental firing. The condenser cooling water is routed through a mechanical draft wet cooling tower where its latent heat is dissipated to the atmosphere.

A selective catalytic reduction (SCR) system to control NOx in the exhaust gases will be installed in each HRSG. Diluted ammonia vapor will be injected into the gas stream upstream of a catalyst. The subsequent chemical reaction reduces NOx to nitrogen and water. Unreacted ammonia will pass through the exhaust stack as ammonia slip.

EPA previously proposed a PSD permit in 2003. After proposal, the applicant revised the original PSD application to increase the amount of emissions that would occur during start-up and shut-down. The applicant included this information in an application update dated August 10, 2006. Therefore, EPA is reproposing the permit for public comment.

IV. EMISSIONS FROM THE PROPOSED PROJECT

The annual emission data presented in Table 1 is based on the maximum expected emissions, including emissions from each startup and shutdown cycle, from Attachment B of the applicant's August 10, 2006 information supplementing the permit application.

Table 1. Estimated Emissions

Pollutant	Estimated Annual Emissions (tons/year)	Significant Emission Rate (Tons/year)
CO	684	100
NOx	202	40
PM_{10}	61	15
VOC	25	40
SOx	23	40

V. APPLICABILITY OF THE PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REGULATIONS

The PSD regulations (40 CFR 52.21) define a "major source" as any source type belonging to a list of 28 source categories which emits or has the "potential to emit" 100 tons per year (tpy) or more of any pollutant regulated under the Clean Air Act, or any other source type which emits or has the potential to emit such pollutants in amounts

equal to or greater than 250 tpy. Since BEP II, as a fossil fuel-fired steam electric plant of more than 250 MMBtu/hr heat input, is one of the 28 source categories specified in EPA regulations, the 100 tpy threshold applies.

Under the PSD regulations, a significant emissions increase is defined as an increase in emissions greater than the threshold prescribed for any pollutant subject to the regulation. PSD review applies to all pollutants from a new major source showing a significant increase in emissions for which the applicable federal National Ambient Air Quality Standards (NAAQS) have not been exceeded (attainment areas), or areas where the status of the area is uncertain (unclassified). The proposed facility is located in an area in Riverside County that, as noted above, currently has a designation of unclassified/attainment for all pollutants.

The current estimated emission profile in Table 1 shows that the facility is a major source because the emissions from this project exceed the major source applicability levels of 100 tpy for NOx and CO. PM_{10} emissions from this project also exceed the significance level of 15 tpy, and therefore are regulated under this PSD permit. VOC and sulfur dioxide do not exceed the significance level, and therefore are not subject to PSD.

EPA has determined that BEP II will be a new major source, and not a major modification to the existing Blythe I power plant. This determination is based on the fact that the two facilities have two separate owners. The Mojave Desert AQMD permitted BEP II as a major modification (Final Determination of Compliance, or "FDOC" dated May 3, 2004 page 2), and the FDOC does not contain information on the process used to make this determination. EPA is continuing to treat BEP II as a new major source for the purposes of PSD permitting, as proposed in our 2003 proposal, because we have not received any new information that would contradict our initial determination for PSD permitting purposes. We have also determined that BEP II is subject to the same PSD requirements, i.e. regulation for NOx, CO, and PM10, regardless of whether Blythe II is considered a new major stationary source or major modification to the existing Blythe I power plant. Because we have not reviewed the process that Mojave Desert AQMD used to reach their determination, this proposed PSD permit should not be considered guidance on how the Mojave Desert AQMD should interpret their regulations on this issue.

Thus NOx, CO, and PM_{10} are subject the following PSD analysis:

1. Application of Best Available Control Technology (BACT);

2. Analysis of ambient air quality impacts from the project;

3. Analysis of air quality and visibility impacts on Class I areas; and

4. Analysis of impacts on soils and vegetation.

VI. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

The federal Clean Air Act defines BACT as follows:

The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under the Clean Air Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable through application of production processes and available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of BACT result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 (NSPS) or 112 (NESHAPS) of the Clean Air Act.

For this facility, a BACT determination is required only for NOx, CO, and PM_{10} as they are the only pollutants with emissions above the significant thresholds. The Applicant's BACT analyses for NOx, CO, and PM_{10} and our evaluation of these analyses are discussed below.

A. Nitrogen Oxides

EPA's 2003 technical analysis reviewed five existing or permitted facilities to establish 2.0 ppm NOx as the BACT emissions limit. We continue to believe that 2.0 ppm NOx is achieved in practice, and represents the lowest emission rate that has been met for this class or category of source. Blythe II stated in its August 10, 2006 letter updating its original 2003 application that it would meet 2.0 ppm NOx as BACT. Therefore, US EPA is choosing the strictest numerical emission rate, and further analysis of the numerical emission rate is unnecessary.

EPA is proposing a 3-hour averaging time. The primary justification for the three-hour averaging time is to provide operational flexibility, while ensuring that compliance with the 2.0 ppmvd (@ 15% oxygen) BACT limit can be maintained on a continuous basis. The electric energy market is in a state of flux and is currently very competitive. Due to increases in natural gas prices and the overcapacity in the US electric power market after 2002, conditions have shifted such that the nuclear and coal-based plants are commonly the lowest cost electricity producers and operate in base load. This significantly reduced the number of hours that the deregulated gas turbine-based plants currently can operate economically. Currently, many gas turbines run in a cyclic duty profile with daily start cycles fulfilling peak power requirements, which justifies a 3-hour averaging time being necessary.

The proposed combined cycle plant configuration is most suited to operate as a base-load facility, which can operate with very low NO_x emission limits. However, the current dispatch requirements necessitate being able to operate during fluctuating loads. This type of operation often requires that the units operate at varying load levels, some of which are not conducive to maximum efficiency, and therefore optimum emissions control. If operating in this fashion causes brief excursions from the very low 2.0 ppmvd NO_x limit, a three-hour averaging time provides additional time to return to and maintain compliance.

Although some permits have been issued with a 1-hour averaging time (such as Mountain View), those permits contain certain exception periods when the sources would not be meeting the 1-hour 2.0 ppm NOx limit. Thus, we believe that a 2.0 ppm emission limit with a 3-hour averaging time is appropriate as NOx BACT for this facility.

B. Carbon Monoxide

US EPA has reviewed the available CO BACT options, including the 4.0 ppm CO limit originally proposed by US EPA in 2003. The Applicant has stated (see August 2006 letter) that it will meet the 4.0 ppm CO limit without purchasing an oxidation catalyst. US EPA is not proposing to require a CO oxidation catalyst, but will require that the Applicant provide sufficient space to retrofit a CO oxidation catalyst in case it cannot meet the CO BACT emission limit through good combustion practices.

US EPA is not proposing to require an oxidation catalyst because of 1) the applicant's commitment to meet the 4.0 ppm CO emission limit without an oxidation catalyst, and 2) the cost of installing a catalyst to reduce emissions down from 4.0 ppm CO to 2.0 ppm. The applicant originally obtained cost data showing that the cost would be in excess of $10,000 per ton of CO removed. This cost-effectiveness value was based on the Applicant's original proposal of 4.0 ppm CO without duct burning and 7.0 ppm CO with duct burning. Now that the applicant has agreed to the lower 4.0 ppm CO emission limit at all times, the catalyst would achieve less tons of CO reduced with a catalyst and thus would be less cost-effective. Thus, the proposed permit does not require the installation of oxidation catalysts to meet this limit. However, if the applicant cannot comply with the BACT emission limit of 4.0 ppm without add-on control technology, the applicant may will have to install oxidation catalyst.

We are proposing the same 3-hour averaging time for CO as for NOx. First, this 3-hour averaging time establishes an appropriate balance between reducing emissions as much as possible at all times, and providing the applicant flexibility to

respond to unforeseen load conditions and variations cited in an email message of November 15, 2006. Secondly, we believe that the averaging time corresponds appropriately with the one and eight hour National Ambient Air Quality Standards for carbon monoxide. While the permit applicant has requested a 24-hour averaging time, we believe that this 3-hour averaging time provides adequate flexibility to address variability, and has been achieved in practice (for example, see EPA-issued Elk Hills PSD permit SJ-99-02, or Sutter Power Plant SAC 98-01, which has a one-hour averaging time).

C. PM_{10}

Particulate emissions from the proposed project come from two sources: the gas turbine trains (fuel sulfur, inert trace contaminants, incomplete combustion hydrocarbons, etc) and the cooling towers (water evaporation and particulate mist entrainment). The combination of good combustion control and low or zero ash fuel (i.e., natural gas) is generally considered BACT for the control of gas turbine $PM_{10.}$ The use of high-efficiency mist eliminators is generally regarded as a satisfactory method to control PM_{10} for cooling towers.

BEP II's May 2002 PSD application proposed the exclusive use of natural gas fuel with a sulfur content of no more than 0.5 grains per 100 scf for the gas turbines. At the same time, the application proposed that the cooling towers be equipped with mist eliminators limiting drift to 0.0006%, which is the limit required in most recent power plant permits with wet cooling towers. Upon review of the relevant data, we have determined that these proposals satisfy BACT requirements for this project and did not receive any comments on this determination when we previously proposed a permit in 2003.

VII. AIR QUALITY IMPACTS

The PSD regulations require an air quality analysis to determine the impacts of the proposed project on ambient air quality. For all regulated pollutants emitted in significant quantities (see Table 1 above), the analysis must consider whether the proposed facility will cause a violation of (1) the National Ambient Air Quality Standards (NAAQS), or (2) the applicable PSD increments. A discussion of the general approach, air quality model selection, significant impact levels, PSD increment consumption, and the project's compliance with ambient air quality standards is presented below. (Note: only $NO_{2,}$ CO, and PM_{10} are discussed in this section, since they are the only pollutants subject to PSD review.)

A. Background Ambient Air Quality

Ambient air quality data in the Blythe area was collected up to 1992 only. Because

of this lack of data, BEP II selected the data collected at the Twentynine Palms station, approximately 90 miles west-northwest of Blythe, as the most representative of the Blythe area's background air quality. The selection of the Twentynine Palms data was based on the following criteria:

- Closest available monitoring station to the proposed project;
- Most complete (1997 and 1998) set of data;
- Twentynine Palms is in the same air basin as the project's location; and
- Proximity to Joshua National Tree National Park, the nearest Class I area to the project.

B. Modeling Methodology

Modeling for the proposed project was evaluated to verify whether the modeled concentrations plus background concentrations would exceed the NAAQS for NO_2, PM_{10}, or CO, and whether the NO_2 concentrations would exceed the PSD annual Class I and Class II increments. PM_{10} increment analysis is not required because PM_{10} maximum cumulative project impact rates are less than the significant modeling concentration levels. BEP II's modeling was based on the EPA Guideline on Air Quality Models (GAQM), using the EPA Industrial Source Complex Short Term Version 3 (ISCST3) dispersion model, version 98356. BEP II's cumulative impact analysis includes both normal operations and startup/shutdown operations. BEP II used worst-case emissions as inputs (100% full load or mixed full load and startup for averaging times longer than one hour and uncontrolled startup conditions for one-hour averaging times). Based on the land use classification procedure of Auer (1978), land use in the surrounding area is greater than 50% rural. Therefore, rural dispersion coefficients are assigned in the modeling analyses. Five years of meteorological data (1989-1993) were used in the cumulative impact analysis. This data was collected at a monitoring station in city of Blythe. Mixing heights data was collected at Desert Rock, Nevada.

C. NAAQS Compliance

BEP II's modeling results show that the project's total impacts (maximum modeled cumulative plus monitored background) will not violate any NAAQS (see Table 2).

Table 2. NAAQS Compliance Results

Pollutants	Averaging Period	Maximum Cumulative Project Impact ($\mu g/m^3$)	Significant Modeling Concentration ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2 – footnote 1	Annual	0.31	1	11	12	100
PM_{10} – footnote 1	24-hour	1.6	5	84	86	150
PM_{10}	Annual	0.4	1	24	24	50
CO – footnote 2	1-hour	6233	2000	3191	9424	40000
CO	8-hour	754	500	1891	2645	10000

D. Increment Consumption Analysis

Modeling results indicate that the project is below the significance level for NO2 and will not consume the allowable Class I or Class II increments for NO_2 (see Table 3). The closest Class I area to the proposed plant is the Joshua Tree National Park, about 75 km northwest of the site. The area surrounding the Blythe project is classified as Class II. (Note: there are no PSD Class I or Class II increments for CO.)

1 Attachment C – CEC Final Staff Assessment July 2002 and August 2006 application. The maximum cumulative project impact for the annual NO2 of 0.29 ($\mu g/m^3$) has been scaled to reflect the higher current emissions. Maximum PM10 estimated based on 2002 permit application (page 7.7-47) and August 2006 letter requesting addition of evaporative cooler, and making the conservative assumption that evaporative cooler impacts occur at the same location as the maximum impacts from other emission units.

2 Arcadis August 10, 2006 – Attachment D, ENSR

Table 3. Class I and Class II Increment Consumption

Pollutant	Averaging Period	Class I Impact ($\mu g/m^3$)	Allowable Class I Increment ($\mu g/m^3$)	Class II Impact ($\mu g/m^3$) – footnote 3	Allowable Class II Increment ($\mu g/m^3$)
NO_2	Annual	0.009	2.5	0.72	25

VIII. ADDITIONAL IMPACT ANALYSIS

In addition to assessing the ambient air quality impacts expected from a proposed new source, the PSD regulations require that certain other impacts be considered. These include impacts on visibility, soils and vegetation, and growth.

A. Visibility

The PSD regulations require that PSD permit applications address the potential impairment to visibility in Class I areas. Class I areas are national or regional areas of special natural, scenic, recreational, or historic value for which the PSD regulations provide special protection. Air quality degradation in all Class I areas is limited by Class I increments for SO_2, PM_{10}, and NO_x. No specific increment exists for the impact of CO on a Class I area. There is one Class I area in the vicinity of the project site: Joshua Tree National Park

BEP II used a screening mode of the CALPUFF modeling system to predict visibility and deposition impacts at the Joshua Tree National Park Class I area. The results of the modeling indicate that light extinction changes at Joshua Tree National Park are predicted to be less than five percent for any 24-hour period of the five year modeling period. The highest 24-hour decrease in visibility is predicted to be 4.32 percent. According to the Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report (December 2000), a cumulative effects analysis of new source growth on visibility impairment should be conducted. However, such an analysis would not be expected if the visibility impact of a proposed source is less than 5%. Since the visibility modeling results show that the highest change in the light extinction coefficient at the Joshua Tree National Park in the five-year period is predicted to be 4.32 percent, the potential plant's emissions are not expected to significantly impact the regional haze at the Class I area.

3 Project Impact ($\mu g/m^3$) from May 3, 2004 Final Determination of Compliance and FSA April 2005, p 4.1-23

B. Soils and Vegetation

The project site is highly disturbed as a result of historic military air base activities and agricultural activities. No sensitive plants were found in the on the project site or in the surrounding area during the site survey. Existing citrus orchards border the project site.

For most types of soils and vegetation, ambient concentrations of criteria pollutants below the secondary NAAQS will not result in harmful effects. Since the total estimated maximum ambient NO_2 concentrations within the impact area is below the secondary NAAQS for NO_2 (100 $\mu g/m^{3)}$ and PM_{10} (50 and 150 $\mu g/m^3$), harmful effects due to the project's emissions of NO_2 are not expected. BEP II also performed an evaluation of the effects of PM_{10} on nearby vegetation or crops and confirmed that the deposition would not cause any adverse impacts on them. (Note: There are no secondary NAAQS for CO.)

The deposition impacts at Joshua Tree National Park are shown in Table 4 below.

Table 4 Deposition Impacts at Joshua Tree National Park (Table 7.7-35 5/10/2002 Application)

Pollutant	24 hour Deposition (kg/hectare)	Annual Deposition (kg/hectare)
Total Nitrogen	0.000197	0.0273
Total Sulfur	0.0000759	0.0016

C. Growth

Growth impacts due to the proposed project are not expected to be significant. Only about 20 permanent workers will be hired for the plant. Thus, any additional industrial, commercial, or residential needs will be minimal. The increased traffic resulting from the expected BEP II's workforce will, as a result, be negligible compared to the existing highway traffic in the area.

IX ENDANGERED SPECIES

Pursuant to Section 7 of the Endangered Species Act (ESA), 16 U.S.C. § 1536, and its implementing regulations at 50 CFR Part 402, EPA is required to ensure that any action authorized, funded, or carried out by EPA is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of such species' designated critical habitat. EPA has determined that

this PSD permitting action triggers ESA Section 7 requirements. EPA is therefore required to consult with the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS) if an endangered species or threatened species may be present in the area affected by the permit project and if EPA's action (i.e., permit issuance) may affect such species. EPA is also required to confer with the Services on any action which is likely to jeopardize the continued existence of any species proposed for listing (as endangered or threatened) or result in the destruction or adverse modification of habitat proposed to be designated as critical for such species.

When a federal action involves more than one agency, consultation and conference responsibilities may be fulfilled through a lead agency pursuant to 50 CFR § 402.07. For the BEP II project, the Western Area Power Administration (WAPA) is the lead federal agency for purposes of fulfilling responsibilities under Section 7 of the ESA. WAPA was also the lead agency for the Blythe Energy Project on the same site (permitted by EPA in March 2001). For that project, FWS issued a final Biological Opinion (BO) that addressed the impacts that the proposed project may have on the federally threatened desert tortoise (Gopherus agassizii). The BO concluded that the Blythe Energy Project, as proposed, was not likely to jeopardize the continued existence of the desert tortoise. In addition to an incidental take statement, FWS imposed Reasonable and Prudent Measures ("RPMs") to minimize incidental take, a set of terms and conditions to implement these measures, and additional notification requirements. For the BEP II project, the Fish and Wildlife Service determined on January 20, 2005 that BEP II either will not affect, or will not adversely affect, all listed species of potential concern. Tyler Grant of the Fish and Wildlife Service confirmed via phone the week of October 23rd, 2006 that US EPA does not have any remaining ESA consultation obligations.

X. TITLE IV (ACID RAIN PERMIT)

The Applicant must apply for and obtain an acid rain permit. The Applicant will apply for this permit after the facility is constructed.

XI. CONCLUSION AND PROPOSED ACTION

Based on the information supplied by the applicant and our review of the analyses contained in the permit application, and supplemental information, EPA is proposing to issue a PSD permit to BEP II because the proposed project will install and operate BACT and will not cause or contribute to a violation of the NAAQS, or an exceedance of PSD increments. After consideration of any comments on the proposed permit, EPA intends to make a final decision on this application an Approval to Construct for BEP II.